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A taxonomic review of the genus *Hexacenthrus* Serville from China (Orthoptera: Conocephalidae)

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Abstract: This paper reviewed the species of the genus *Hexacentrus* Serville from China, listed the key to species of the genus *Hexacentrus* from China, and described a new species, namely *Hexacentrus expansus* sp. nov. This new species is close to *H. inflatissimus* Gorochov & Warcholowska-Sliwa, 1999 and *H. yunnaneus* Bey-Bienko, 1962, but differs from the former in: 1) body obviously small; 2) Cu2 vein of male left tegmen long and straight; 3) Rs vein of male tegmina arising from about the end of R vein; 4) tegmina of female narrow, not reaching the apex of ovispositor; and from the latter in: 1) body yellowish green, the third and fourth joints of tarsi blackish brown; 2) Cu2 vein of male left tegmen strong; 3) Rs vein of male tegmina arising from the end of R vein, at base slightly curved; 4) styli slender, longer than the half length of subgenital plate. The type specimens are deposited in the Museum of Hebei University.

Key words: Orthoptera; Conocephalidae; *Hexacentrus*; taxonomic review; new species; China

The genus *Hexacentrus* was erected by Serville in 1831. So far the genus has been recorded with 26 species (subspecies) in the world (Dohrn, 1905; Candell, 1927; Rentz, 2001). In China, 5 species (subspecies) of the genus had been reported previously, i. e., *Hexacentrus fuscipes* Matsumura & Shiraki, 1908; *H. japonicus japonicus* Karny, 1907; *H. mundus mundus* (Walker, 1869); *H. unicolor* (Serville, 1831); *H. yunnaneus* Bey-Bienko, 1962.

Hexacentrus Serville, 1831

Serville, 1831. *Ann. Sci. Nat. Paris*, 22: 145; Burmeister, 1838. *Handbuch der Entomologie*, 2(2): I-VIII: 714; St l, 1874. Recens. Ortho. 2 Locustina: 10; Redtenbacher, 1891. Monogr. Conoceph., 41: 333, 547; Kirby, 1906. Syn. Cat. Orth., 2(1): 287; Karny, 1912. *Genera Insectorum*, 131: 3; Karny, 1931. *Treubia*, 12: 95; Zeuner, 1936. *Trans. Roy. Ent. Soc. London*, 85(12): 299; Zeuner, 1936. *Proc. R. Ent. Soc. London* (*A*), 11(1 – 2): 11 – 22; Gorochov, 1995. *Trudy Zool. Inst.*, 260(1): 1 – 224; Rentz, 1996. Grasshopper Country. The abundant orthopteroid insects of Australia. 88; Otte, 1997. *The Academy of Natural Sciences of Philadelphia*: 70 – 72; Rentz, 2001. *Csiro Publishing Collingwood*. 164 – 167.

***Piura* Walker, 1869**

Walker F, 1869. Cat. Derm. Salt. Brit. Mus., 2: 281; Kirby, 1906. Syn. Cat. Orth., 2(1): 287.

***Tedla* Walker, 1869**

Walker F, 1869. Cat. Derm. Salt. Brit. Mus., 2: 393; Kirby, 1906. Syn. Cat. Orth., 2(1): 287.

Type species: *Hexacentrus unicolor* Serville, 1831

Generic diagnosis: Body size medium to large. Fastigium of vertex compressed, with a median longitudinal sulcus. Pronotal disc expanded backward in the middle, posterior margin of lateral lobe strongly inclining, without humeral sinus. All femora with ventral spines, fore and median tibiae with 6 pairs of long ventral spurs, shortening gradually from the base to the end. Tegmina of male inflated. Cerci of male at the base robust, apical third narrowed and curved inwards, apex pointed. Subgenital plate of male long, posterior margin with shallow notch, styli slender. Tegmina of female normal. Cerci of female simple, conical. Posterior margin of subgenital plate of female with shallow notch. Ovispositor straight, slightly upcurved, acute at apex.

Distribution: Asia, Africa, Australia.

Key to species of the genus *Hexacentrus* from China

1. Prosternum and mesosternum lobes unicolor, femora in the general coloration 2
   Prosternum and mesosternum lobes blackish brown, femora blackish at apex (male unknown) ... ***H. fuscipes* Matsumura & Shiraki, 1908**
2. Speculum of male left tegmina rhombus or subsquare 3
   Speculum of male left tegmina oviform, about 2 times as longe as broad 4
3. Body yellowish green, the third and fourth joints of tarsi blackish brown ..... ***H. expansus* sp. nov.**
   Body ferrugineous, abdomen with a pair of broad brown lateral stripes, tarsi blackish brown (female unknown) ..... ***H. yunnaneus* Bey-Bienko, 1962**
4. Tegmina of male obviously inflated, Cu2 vein thickened in the base, stridulatory file with 2 – 3 large teeth in the middle. ..... ***H. mundus mundus* (Walker, 1869)**
   Tegmina of male slightly inflated, Cu2 vein same wide, stridulatory file with 6 – 7 large teeth in the middle 5
5. Tegmina of male short and broad, about 2.75 – 3.00 times as long as broad; tegmina of female short, not reaching apex of hind femora; ovipositor relatively longer, 15 – 16 mm ..... ***H. japonicus japonicus* Karny, 1907**

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Tegmina of male long and narrow, about 2.95 – 3.30 times as long as broad; tegmina of female long, obviously exceeding apex of hind femora; ovipositor relatively shorter, 13 – 14 mm ..... ***H. unicolor* Serville, 1831**

***Hexacentrus fuscipes* Matsumura & Shirak, 1908** / Type locality: China (Taiwan: Hoppo)

Matsumura & Shiraki, 1908. *J. Coll. Agric. Tohoku Imp. Univ.*, 3 (1): 1 – 8; Karny, 1912. *Genera Insectorum*, 131: 16; Liu & Jin, 1992 – 1993. *Contr. Shanghai Inst. Entomol.*, 11: 117; Jin & Xia, 1994. *J. Orth. Res.*, 3: 15 – 51; Otte, 1997. *The Academy of Natural Sciences of Philadelphia*. 70 – 72.

No material examined.

Distribution: China (Taiwan).

***Hexacentrus japonicus japonicus* Karny, 1907/** Type locality: Japan (Yokohama)

Karny, 1907. *Abh. Zool.-bot. Gen. Wien*, 4 (3): 111; Karny, 1912. *Genera Insectorum*, 131: 16; Tinkham, 1936. *Lingnan Sci. J. Cantonl.*, 5(2): 213; Furukawa, 1941. *Zool. Mag. Tokyo.*, 53: 368; Bey-Bienko, 1955. *Zool. Zhurn*, 34: 1262; Liu & Jin, 1992 – 1993. *Contr. Shanghai Inst. Entomol.*, 11: 117; Jin & Xia, 1994. *J. Orth. Res.*, 3: 15 – 51; Otte, 1997. *Orthoptera Species File 7 Tettigoniodea*, *The Orthopteri-sts 'S*. 70 – 72.

Material examined. 3 ♂♂, 2 ♀♀, Mt. Qingcheng, Sichuan, 1 – 2 Aug., 1999. 2 ♂♂, Mt. Emei, Sichuan, 4 Aug, 1999. 9 ♂♂, 7 ♀♀, Mt. Simian, Chongqing, 30 July, 2003. 2 ♂♂, Zhangjiajie, Hunan, 11 Aug., 2001. 2 ♂♂, 1 ♀, Mt. Fanjing, Guizhou, 28 July, 2001.

Distribution: China (Shandong, Henan, Sichuan, Chongqing, Hunan, Shanghai, Anhui to Fujian); Japan.

***Hexacentrus mundus* (Walker, 1869)** / Type locality: Indo-Malaysia (Ceram)

Walker. 1869. Cat. Derm. Salt. Brit. Mus., 2: 282; Kirby, 1906. Syn. Cat. Orth., 2: 287; Karny, 1912. *Genera Insectorum*, 131: 15; Karny, 1926. *Treubia*, 7 (2): 201; Chang, 1935. Mus. Heude, Not. entom. Chinoise, 2: 43; Wu, 1935. Cat. Insect, 1: 103; Liu & Jin, 1992 – 1993. *Contr. Shanghai Inst. Entomol.*, 11: 117; Jin & Xia, 1994. *J. Orth. Res.*, 3: 15 – 51; Otte, 1997. *The Academy of Natural Sciences of Philadelphia*. 70 – 72.

***annulicornis* Stål, 1877/** Type locality: Indo-Malaysia; Philippines

Stål, 1877. *Ofv. K. Vetensk. Akad. Forh.*, 34: 46; Redtenbacher, 1891. Monogr. Conoceph., 41: 548, 51; Kirby, 1906. Kirby, 1906. Syn. Cat. Orth., 2(1): 287; Karny, 1912. *Genera Insectorum*, 131: 15.

***sellata* (Walker, 1869)** / Type locality: Indo-Malaysia; India (Assam, Silhet)

Walker F, 1869. Cat. Derm. Salt. Brit. Mus., 2: 393; Kirby, 1906. Syn. Cat. Orth., 2(1): 287; Karny, 1912. *Genera Insectorum*, 131: 15.

***simplex* (Walker, 1870)** / Type locality: Indo-Malaysia (Hindustan)

Walker F, 1870. Cat. Derm. Salt. Brit. Mus., 3: 484; Kirby, 1906. Syn. Cat. Orth., 2(1): 287; Karny, 1912. *Genera Insectorum*, 131: 15.

Material examined. 4 ♂♂, Nanning, Guangxi, 23 July, 2001. 4 ♂♂, Mt. Shiwan, Guangxi, 17 – 18 July, 2001. 1 ♂, 2 ♀♀, Mengla, Yunnan, 20 Sep., 1979. 2 ♀♀, Mengla, Yunnan, 24 Sep., 1979,. 1 ♂, 1 ♀, Mengla, Yunnan, 21 Aug., 1998. 1 ♂, Jinhong, Yunnan, 8 Oct., 1979. 1 ♀, Simao, Yunnan, 12 Sep., 1979. 1 ♀, Mang City, Yunnan, 25 Aug., 1979. 1 ♂, Mang City, Yunnan, 25 Aug., 1979. 1 ♀, Mt. Chang, Yunnan, 10 Oct., 2000. 3 ♀♀, Xishuangbanna, Yunnan, 10 July-1 Aug., 2003.

Distribution: China (Guangxi, Yunnan), Japan, India, Malacca, Philippines.

***Hexacentrus unicolor* Serville, 1831/** Type locality: Indo-Malaysia; Indonesia (Java)

Serville, 1831. *Ann. Sci. nat. Paris*, 22: 146; Serville, 1839. *Hist. Nat. Ins., Orthopt.*, 531; Redtenbacher, 1891. Monogr. Conoceph.. 458, 552; Kirby, 1906. Syn. Cat. Orth., 2: 287; Karny, 1912. *Genera Insectorum*, 131: 16; Karny, 1923. *Jour. Roy. Asiat. Soc., Malay. Branch*, 1: 182; Karny, 1926. *J. Fed. Malay States Mus.*, 13(2 – 3): 144; Caudell, 1927. *Proc. U. S. Nat. Mus.*, 71: 1 – 42; Karny, 1931. *Treubia*, 12: 95; Willemse, 1933. *Mem. Mus. Hist. nat. Belgique*, 4/8: 17; Wu, 1935. Cat. Insect, 1: 103; Tinkham, 1936. *Lingnan Sci. J. Canton.*, 15 (2): 213; Ebner, 1939. *Lingnan Sci. J.*, 18: 297; Furukawa, 1941. *Zool. Mag. Tokyo*, 53: 368; Tinkham, 1943. Notes d' Ent Chinoise, 10(2): 51; Liu & Jin, 1992 – 1993. *Contr. Shanghai Inst. Entomol.*, 11: 117; Jin & Xia, 1994. *J. Orth. Res.*, 3: 15 – 51; Otte, 1997. *The Academy of Natural Sciences of Philadelphia*. 70 – 72.

***plantaris* Burmeister, 1838/** Type locality: unknown

Burmeister, 1838. *Handb. Ent.*, 2: 714; De Haan, 1842. Bijdrag. Kennis Orthopt., 215, 216; Kirby, 1906. Syn. Cat. Orth., 2: 288; Karny, 1912. *Genera Insectorum*, 131: 16; Karny, 1923. *Jour. Roy. Asiat. Soc. Malay. Branch.*, 1: 182.

Material examined. 7 ♂♂, Mt. Jinfo, Chongqing, 24 – 27 July, 2003. 10 ♂♂, 6 ♀♀, Libo, Guizhou, 19 – 24 July, 2000. 2 ♂♂, 1 ♀, Mt. Sijian, Guangxi, 31 Aug., 2001.

Distribution: China (Sichuan, Chongqing, Guizhou, Hubei, Jiangxi, Shanghai, Fujian, Zhejiang, Guangxi, Taiwan).

***Hexacentrus yunnaeus* Bey-Bienko, 1962/** Type locality: China (Yunnan, Hekou)

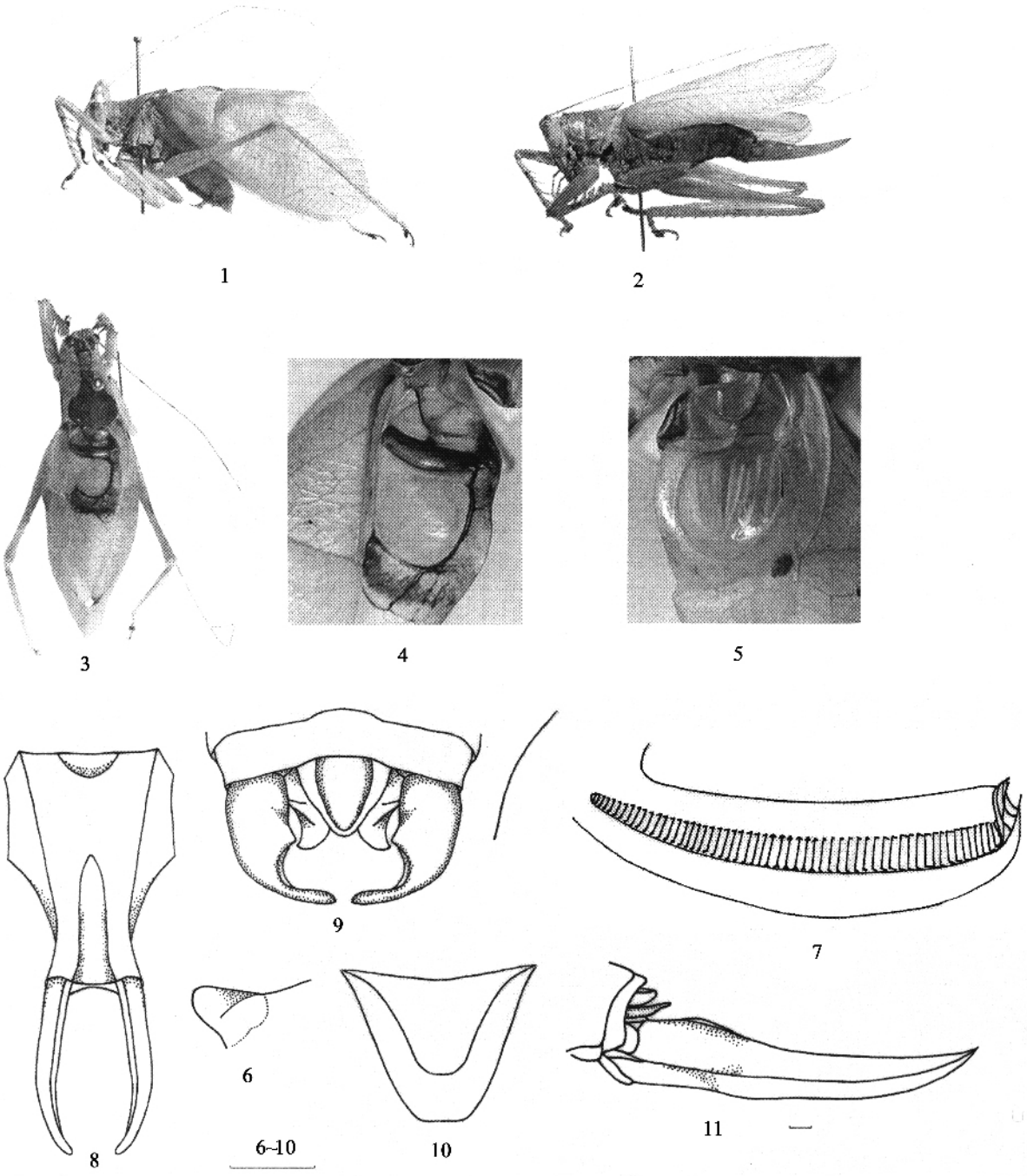
Bey-Bienko, 1962. *Trudy zool. Inst. Akad. Nauk SSSR*, 30: 135; Liu & Jin, 1992 – 1993. *Contr. Shanghai Inst. Entomol*, 11: 117; Jin & Xia, 1994. *J. Orth. Res.*, 3: 15 – 51; Otte, 1997. *The Academy of Natural Sciences of Philadelphia*. 70 – 72.

No material examined.

Distribution: China (Yunnan).

***Hexacentrus expansus* sp. nov.** (Figs. 1 – 11)

Male: Body large. Fastigium of vertex compressed, with a median longitudinal sulcus, triangular from lateral view, connecting with the top of frons. Apex of fastigium of vertex slightly rising. Eyes subglobular. Pronotal disc largely expanded, about 3 times as posterior margin as anterior margin. Lower margins of lateral lobes inclining lowerwards, anterior angle circular, posterior angle obtuse, without humeral sinus. Thoracic foramen large, exposed. Prosternum with slender bispinose; mesosternum with a pair of cylindrical lobes; metasternum lobes triangular, thickened. Fore coaxe with a long spine; fore femora with 4 – 5 internoventral spines and externoventral spines; fore tibiae with 6 pairs of long ventral spurs. Median femora with 2 – 3 internoventral spines and 4 – 5 externoventral spines; median tibiae with 6 pairs of long ventral spurs. Hind femora with 4 internoventral spines and 6 – 7 externoventral spines, knee lobes of hind femora with 1 spine; hind tibiae with 2 pairs of



Figs. 1 – 11 *Hexacentrus expansus* sp. nov.

1. ♂ Body, lateral view; 2. ♀ Body, lateral view; 3. ♂ Body, dorsal view; 4. ♂ Stridulatory field of left tegmen, dorsal view; 5. ♂ Mirror of right tegmen, dorsal view; 6. ♂ Fastigium of vertex, lateral view; 7. ♂ Files of left tegmina; 8. ♂ Subgenital plate, ventral view; 9. ♂ Apex of abdomen, dorsal view; 10. ♀ Subgenital plate, ventral view; 11. ♀ Ovispositor, lateral view. Scales = 1 mm.

long apical spurs, 36 – 38 dorsal spines and 22 – 28 ventral spines. Femora with numerous very small denticles between ventral spines. Tegmina long, obviously exceeding the apex of hind femora, obviously inflated transversely, dorsum flat. M vein at the base thickened, curved transversely; speculum large, subsequare, Cu2 vein strong and straight; stridulatory files with about 60 teeth, teeth-distance subequal. Rs vein arising from about apex of R vein, base slightly curved, with 3 branches, the top of tegmina roundly widened. Hind wings slightly shorter than tegmina. Posterior margin of 10th abdominal tergite with a broad middle shallow notch. Cerci at the base robust, apical third abruptly narrowed and curved inwards, apex pointed. Subgenital plate long, lateral margins constricted, posterior margin with shallow triangular notch, styli slender, longer than the half length of subgenital plate, curled at apex after died.

Female: Tegmina narrow, reaching the apex of hind femora, Rs vein arisng from the middle of R vein, at base straight, with 2 – 3 branches. Cerci short, conical, slightly curved inwards, apex pointed. Subgenital plate short, triangular, apex truncate. Ovispositor straight, shorter than the length of hind femora, the base thickened, apex acute.

Body yellowish green. Antenna with blackish brown annuluses. The middle portion of dorsum of head brown to blackish brown. Pronotum disc with a brown middle stripe, with narrow black lateral sides, lateral lobes in the general coloration. Spines of legs black, spurs of fore and median tibiae at base with black brown spots, all third and fourth joints of tarsi blackish brown. Cu2 vein of male blackish brown, dorsum of tegmina with blackish brown spots around mirror, speculum of male left tegmen transparent.

Holotype ♂, Mt. Simian, Jiangjin, Chongqing, 31 July, 2003, collected by Jianfeng Wang *et al*. Paratype 3 ♂♂, 30 – 31 July, 2003, other data same as holotype, 1 ♀, 1 Aug., 2003, other data same as holotype.

Measurements (mm): Length of body: ♂22.5 – 25.0, ♀28.0; length of pronotum: ♂9.0 – 9.5, ♀ 8.0; length of tegmina: ♂ 37.0 – 39.0, ♀ 27.0; width of tegmina: ♂ 16.0 – 16.5, ♀ 7.0; length of fore femora: ♂ 9.0, ♀ 9.5; length of hind femora: ♂ 19.5 – 21.0, ♀ 22.0; length of ovispositor: ♀ 16.5.

Comparison: This new species is closed to *H. inflatissimus* Gorochov & Warcholowska-Sliwa, 1999 and *H. yunnanaeus* Bey-Bienko, 1962, but differs from the former in: 1) body obviously small; 2) Cu2 vein of male left tegmen long and straight; 3) Rs vein of male tegmina arising from about about apex of R vein; 4) tegmina of female narrow, not reaching the apex of ovispositor; and from the latter in: 1) body yellowish green, the third and fourth joints of tarsi blackish brown; 2) Cu2 vein of male left tegmen strong; 3) Rs vein of male tegmina arising from about apex of R vein, at base slightly curved; 4) styli slender, longer than the half length of subgenital plate.

Discussion

The genus *Hexacentrus* is mainly distributed in the tropical and partly subtropical regions (from Africa to Oceania) (Gorochov, 1999). In China, the species of the genus *Hexacentrus* are mainly distributed in the southern area of China.

H. unicolor, *H. japonicus japonicus* and *H. mundus* ought to belong to a group in morphology (Furukawa, 1941). *H. japonicus japonicus* is close to *H. unicolor*, and both are widely distributed in Southwest, Central and South of China, *H. japonicus japonicus* is ranged to Henan and Shandong, tegmina relatively shorter; *H. mundus* is only distributed in Guangxi and Yunnan, tegmina of them relatively longer, broader. These characters in morphology supported the point of Furukawa, 1941, the three species belong to a group.

This new species is allied to *H. yunnanaeus* Bey-Bienko, 1962 and *H. inflatissimus* Gorochov & Warcholowska-Sliwa, 1999 in morphology, and both latter species are distributed in Yunnan, China and Vinh Phu, Vietnam. Male tegmina of these species is obviouly inflated. They are distributed in narrow area, and may have evolved from a common ancestor. *H. fuscipes* is only distributed in Taiwan China, for geographical circumstance on Taiwan island is relatively isolated so it maybe produced some peculiar species.

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中国似织螽属分类研究
(直翅目：草螽科)

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摘要：本文对中国似织螽属已知种类进行了研究，并列出了该属已知种的检索表，同时记述一新种，即宽翅似织螽 *Hexacentrus expansus* sp. nov.。该新种与 *H. inflatissimus* Gorochov & Warcholowska-Sliwa，1999 和 *H. yunnaneus* Bey-Bienko，1962 相似，与前者的主要区别：1)体明显较小；2)雄性左前翅 Cu2 脉较长且直；3)雄性前翅 Rs 脉从 R 脉近端部分出；4)雌性翅狭，不到达产卵瓣端部；与后者的主要区别：1)体黄绿色，跗节第 3、4 节黑色；2)雄性左前翅 Cu2 脉粗壮；3)雄性前翅 Rs 脉从 R 脉近端部分出，基部稍弯曲；4)雄性腹突细长，长于下生殖板的 1/2。模式标本保存于河北大学博物馆。

关键词：直翅目；草螽科；似织螽属；分类研究；新种；中国
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